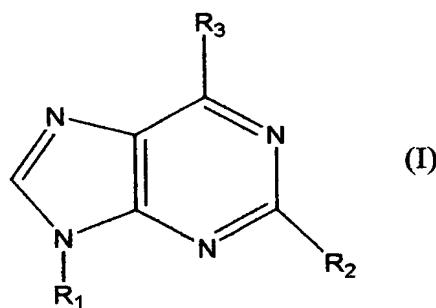
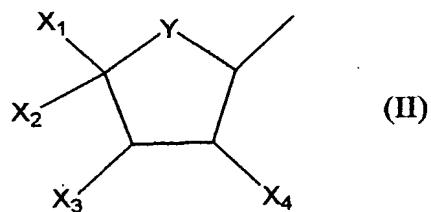


CLAIMS:

1. A method for inducing G-CSF secretion within the body of a subject, comprising administering to the subject an effective amount of an active ingredient selected from the group consisting of an adenosine A3 receptor agonist (A3RAg), an A1 adenosine receptor agonist (A1RAg) and a combination of an A3RAg and an A1RAg.
- 5 2. A method according to Claim 1, wherein said active ingredient is A3RAg.
3. A method according to Claim 2, wherein the drug is administered orally.
4. A method according to Claim 1, wherein said active ingredient is a nucleotide
- 10 derivative of the following general formula (I):



wherein R₁ is C₁-C₁₀ alkyl, C₁-C₁₀ hydroxyalkyl, C₁-C₁₀ carboxyalkyl or C₁-C₁₀ cyanoalkyl or a group of the following general formula (II):



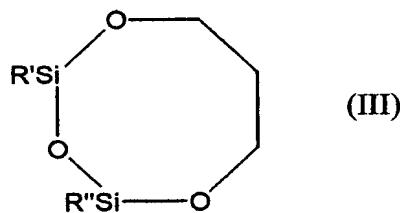
15 in which:

- Y is oxygen, sulfur or carbon atoms;
- X₁ is H, C₁-C₁₀ alkyl, R^aR^bNC(=O)- or HOR^c-, wherein R^a and R^b may be the same or different and are selected from the group consisting of hydrogen, C₁-C₁₀ alkyl, amino, C₁-C₁₀ haloalkyl, C₁-C₁₀ aminoalkyl, C₁-C₁₀

BOC-aminoalkyl, and C₃-C₁₀ cycloalkyl or are joined together to form a heterocyclic ring containing two to five carbon atoms, and R^c is selected from the group consisting of C₁-C₁₀ alkyl, amino, C₁-C₁₀ haloalkyl, C₁-C₁₀ aminoalkyl, C₁-C₁₀ BOC-aminoalkyl, and C₃-C₁₀ cycloalkyl;

5 - X₂ is H, hydroxyl, C₁-C₁₀ alkylamino, C₁-C₁₀ alkylamido or C₁-C₁₀ hydroxyalkyl;

- X₃ and X₄ each independently are hydrogen, hydroxyl, amino, amido, azido, halo, alkyl, alkoxy, carboxy, nitrilo, nitro, trifluoro, aryl, alkaryl, thio, thioester, thioether, -OCOPh, -OC(=S)OPh or both X₃ and X₄ are oxygen connected to >C=S to form a 5-membered ring, or X₂ and X₃ form the ring of 10 formula (III):

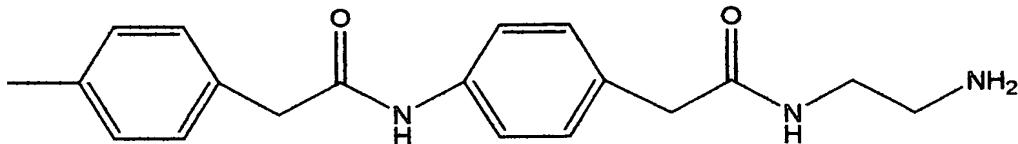


where R' and R'' are independently C₁-C₁₀ alkyl;

15 - R₂ is selected from the group consisting of hydrogen, halo, C₁-C₁₀ alkylether, amino, hydrazido, C₁-C₁₀ alkylamino, C₁-C₁₀ alkoxy, C₁-C₁₀ thioalkoxy, pyridylthio, C₂-C₁₀ alkenyl, C₂-C₁₀ alkynyl, thio, and C₁-C₁₀ alkylthio; and R₃ is a -NR₄R₅ group with R₄ being hydrogen or a group selected from alkyl, substituted alkyl or aryl-NH-C(Z)-, with Z being O, S, or NR^a with R^a having the above meanings,

20 - And R₅, where R₄ is hydrogen, is selected from the group consisting of R- and S-1-phenylethyl, benzyl, phenylethyl or anilide groups unsubstituted or substituted in one or more positions with a substituent selected from the group consisting of C₁-C₁₀ alkyl, amino, halo, C₁-C₁₀ haloalkyl, nitro, hydroxyl, acetoamido, C₁-C₁₀ alkoxy, and sulfonic acid or a salt thereof; or R₄ is benzodioxanemethyl, fururyl, L-propylalanyl- aminobenzyl, β - 25

alanylaminobenzyl, T-BOC- β -alanylaminobenzyl, phenylamino, carbamoyl, phenoxy or C₁-C₁₀ cycloalkyl; or R₅ is a group of the following formula:



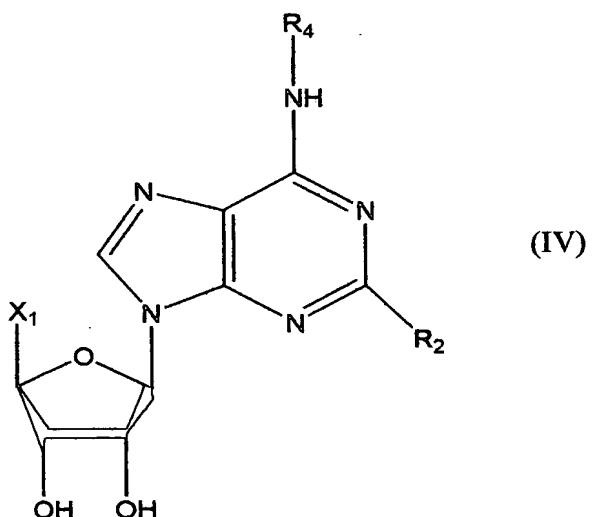
5 - or a suitable salt of the compound defined above, e.g. a triethylammonium salt thereof; or

when R₄ is, a group selected from alkyl, substituted alkyl, or aryl-NH-C(Z)-, then, R₄ is selected from the group consisting of substituted or unsubstituted heteroaryl-NR^a-C(Z)-, heteroaryl-C(Z)-, alkaryl-NR^a-C(Z)-, alkaryl-C(Z)-,

10 aryl-NR-C(Z)- and aryl-C(Z)-;

wherein Z having the above defined meanings.

5. A method according to Claim 4, wherein said active ingredient is a nucleoside derivative of the general formula (IV):



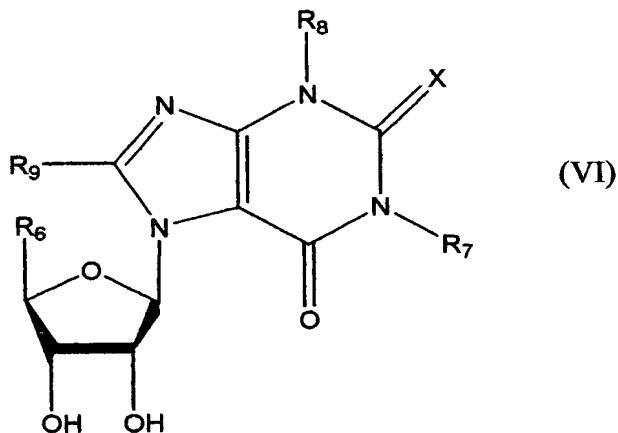
15 in which X₁, R₂ and R₄ are as defined in Claim 3.

6. A method according to Claim 5, wherein said active ingredient is an N6-benzyladenosine-5'-uronamide.

7. A method according to Claim 6, wherein said active ingredient is selected from the group consisting of N^6 -2-(4-aminophenyl)ethyladenosine (APNEA), N^6 -(4-amino-3- iodobenzyl) adenosine-5'-(N-methyluronamide) (AB-MECA) and 1-deoxy-1-{6- [{(3-iodophenyl} methyl]amino}- 9H-purine-9-yl}-N-methyl- β -D-5 ribofuranuron-amide (IB-MECA) and 2-chloro- N^6 -(2-iodobenzyl)-adenosine- 5'-N-methyl-uronamide (Cl-IB-MECA).

8. A method according to Claim 1, wherein the active ingredient is N^6 -benzyl-adenosine-5'-alkyluronamide- N^1 -oxide or N^6 -benzyladenosine-5'-N-dialyl-uronamide- N^1 oxide.

10 9. A method according to Claim 1, wherein the active ingredient is a xanthine-7-riboside derivative of the following general formula (VI):



wherein:

- X is O or S;
- R₆ is R^aR^bNC(=O)- or HOR^c-, wherein
- 15 - R^a and R^b may be the same or different and are selected from the group consisting of hydrogen, C₁-C₁₀ alkyl, amino, C₁-C₁₀ haloalkyl, C₁-C₁₀ aminoalkyl, and C₃-C₁₀ cycloalkyl, or are joined together to form a heterocyclic ring containing two to five carbon atoms; and
- R^c is selected from C₁-C₁₀ alkyl, amino, C₁-C₁₀ haloalkyl, C₁-C₁₀ aminoalkyl, C₁-C₁₀ BOC-aminoalkyl and C₃-C₁₀ cycloalkyl;

- R_7 and R_8 may be the same or different and are selected from the group consisting of C_1 - C_{10} alkyl, C_1 - C_{10} cycloalkyl, R- or S-1-phenylethyl, an unsubstituted benzyl or anilide group, and a phenylether of benzyl group substituted in one or more positions with a substituent selected from the group consisting of C_1 - C_{10} alkyl, amino, halo, C_1 - C_{10} haloalkyl, nitro, hydroxyl, acetamido, C_1 - C_{10} alkoxy, and sulfonic acid;
- R_9 is selected from the group consisting of halo, benzyl, phenyl, C_3 - C_{10} cyclalkyl, and C_1 - C_{10} alkoxy;
or a salt of such a compound, for example, a triethylammonium salt thereof.

10 10. A method for therapeutic treatment, comprising administering to a subject in need an effective amount of an active ingredient for achieving a therapeutic effect, the therapeutic effect comprises induction of G-CSF production or secretion, and said active ingredient selected from the group consisting of an adenosine A3 receptor agonist (A3RAg), an A1 adenosine receptor agonist (A1RAg) and a combination of

15 an A3RAg and an A1RAg.

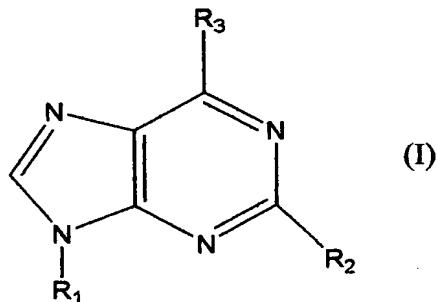
11. A method according to Claim 10, wherein said active ingredient is A3RAg.

12. A method according to Claim 11, wherein the drug is administered orally.

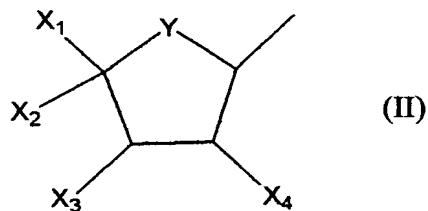
13. A method according to Claim 11, wherein said therapeutic effect is to counter drug-induced myelotoxicity.

20 14. A method according to Claim 13, wherein said drug is a chemotherapeutic drug given to the subject within the framework of anti-cancer treatment.

15. A method according to Claim 11, wherein the active ingredient is a nucleotide derivative of the following general formula (I):



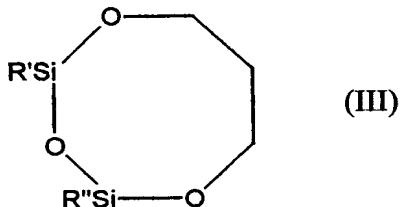
wherein R₁ is C₁-C₁₀ alkyl, C₁-C₁₀ hydroxyalkyl, C₁-C₁₀ carboxyalkyl or C₁-C₁₀ cyanoalkyl or a group of the following general formula (II):



5 in which:

- Y is oxygen, sulfur or carbon atoms;
- X₁ is H, C₁-C₁₀ alkyl, R^aR^bNC(=O)- or HOR^c-, wherein R^a and R^b may be the same or different and are selected from the group consisting of hydrogen, C₁-C₁₀ alkyl, amino, C₁-C₁₀ haloalkyl, C₁-C₁₀ aminoalkyl, C₁-C₁₀ BOC-aminoalkyl, and C₃-C₁₀ cycloalkyl or are joined together to form a heterocyclic ring containing two to five carbon atoms, and R^c is selected from the group consisting of C₁-C₁₀ alkyl, amino, C₁-C₁₀ haloalkyl, C₁-C₁₀ aminoalkyl, C₁-C₁₀ BOC-aminoalkyl, and C₃-C₁₀ cycloalkyl;
- X₂ is H, hydroxyl, C₁-C₁₀ alkylamino, C₁-C₁₀ alkylamido or C₁-C₁₀ hydroxyalkyl;
- X₃ and X₄ each independently are hydrogen, hydroxyl, amino, amido, azido, halo, alkyl, alkoxy, carboxy, nitrilo, nitro, trifluoro, aryl, alkaryl, thio, thioester, thioether, -OCOPh, -OC(=S)OPh or both X₃ and X₄ are oxygen

connected to $>\text{C}=\text{S}$ to form a 5-membered ring, or X_2 and X_3 form the ring of formula (III):



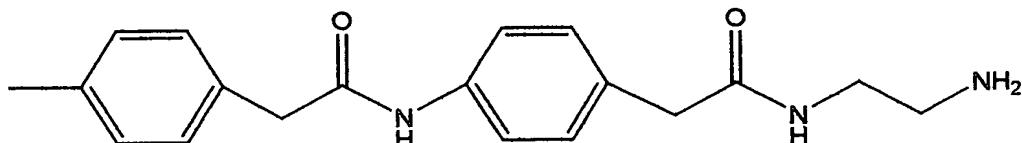
where R' and R'' are independently $\text{C}_1\text{-C}_{10}$ alkyl;

5 - R_2 is selected from the group consisting of hydrogen, halo, $\text{C}_1\text{-C}_{10}$ alkylether, amino, hydrazido, $\text{C}_1\text{-C}_{10}$ alkylamino, $\text{C}_1\text{-C}_{10}$ alkoxy, $\text{C}_1\text{-C}_{10}$ thioalkoxy, pyridylthio, $\text{C}_2\text{-C}_{10}$ alkenyl, $\text{C}_2\text{-C}_{10}$ alkynyl, thio, and $\text{C}_1\text{-C}_{10}$ alkylthio; and

10 R_3 is a $-\text{NR}_4\text{R}_5$ group with R_4 being hydrogen or a group selected from alkyl, substituted alkyl or aryl- $\text{NH-C}(Z)\text{-}$, with Z being O, S, or NR^a with R^a having the above meanings,

15 - And R_5 , where R_4 is hydrogen, is selected from the group consisting of R- and S-1-phenylethyl , benzyl, phenylethyl or anilide groups unsubstituted or substituted in one or more positions with a substituent selected from the group consisting of $\text{C}_1\text{-C}_{10}$ alkyl, amino, halo, $\text{C}_1\text{-C}_{10}$ haloalkyl, nitro, hydroxyl, acetoamido, $\text{C}_1\text{-C}_{10}$ alkoxy, and sulfonic acid or a salt thereof; or R_4 is benzodioxanemethyl, fururyl, L-propylalanyl- aminobenzyl, β -alanylarnino- benzyl, T-BOC- β -alanylaminobenzyl, phenylamino, carbamoyl, phenoxy or $\text{C}_1\text{-C}_{10}$ cycloalkyl; or R_5 is a group of the following formula:

20

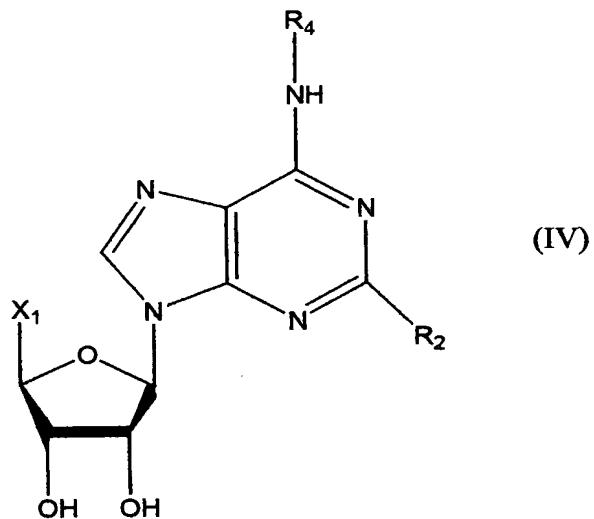


- or a suitable salt of the compound defined above; or

when R₄ is, a group selected from alkyl, substituted alkyl, or aryl-NH-C(Z)-, then, R₄ is selected from the group consisting of substituted or unsubstituted heteroaryl-NR^a-C(Z)-, heteroaryl-C(Z)-, alkaryl-NR^a-C(Z)-, alkaryl-C(Z)-, aryl-NR-C(Z)- and aryl-C(Z)-;

5 wherein Z having the above defined meanings.

16. A method according to Claim 15, wherein said active ingredient is a nucleoside derivative of the general formula (IV):



10 in which X₁, R₂ and R₄ are as defined in Claim 15.

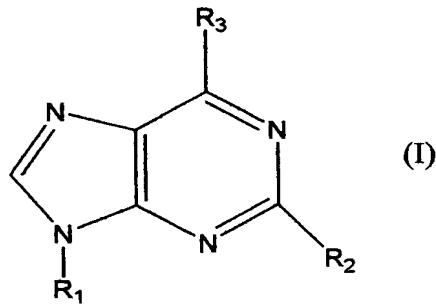
17. A method according to Claim 16, wherein said active ingredient is an N⁶-benzyladenosine-5'-uronamide.

18. A method according to Claim 17, wherein said active ingredient is selected from the group consisting of N⁶-2-(4-aminophenyl)ethyladenosine (APNEA), N⁶-(4-amino-3-iodobenzyl) adenosine-5'-(N-methyluronamide) (AB-MECA) and 1-deoxy-1-{6-[(3-iodophenyl) methyl]amino}-9H-purine-9-yl}-N-methyl-β-D-ribofuranuron-amide (IB-MECA) and 2-chloro-N⁶-(2-iodobenzyl)-adenosine- 5'-N-methyl-uronamide (Cl-IB-MECA).

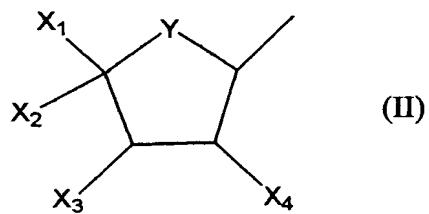
19. A method for inducing proliferation or differentiation of bone marrow or
20 white blood cells in a subject, comprising administering to the subject an effective

amount of an active ingredient selected from the group consisting of an adenosine A3 receptor agonist (A3RAg), an adenosine A2RAn and a combination of an A3RAg or an A2RAn.

20. A method according to Claim 16, wherein said active ingredient is A3RAg.
5 21. A method according to Claim 17, wherein the drug is administered orally.
22. A method according to Claim 19, wherein the active ingredient is a nucleotide derivative of the following general formula (I):



wherein R₁ is C₁-C₁₀ alkyl, C₁-C₁₀ hydroxyalkyl, C₁-C₁₀ carboxyalkyl or C₁-C₁₀ cyanoalkyl or a group of the following general formula (II):



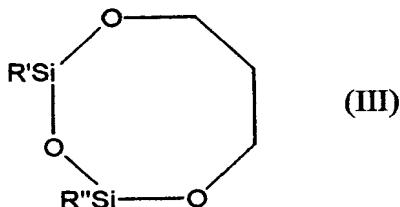
in which:

- Y is oxygen, sulfur or carbon atoms;
- X₁ is H, C₁-C₁₀ alkyl, R^aR^bNC(=O)- or HOR^c-, wherein R^a and R^b may be the same or different and are selected from the group consisting of hydrogen, C₁-C₁₀ alkyl, amino, C₁-C₁₀ haloalkyl, C₁-C₁₀ aminoalkyl, C₁-C₁₀ BOC-aminoalkyl, and C₃-C₁₀ cycloalkyl or are joined together to form a heterocyclic ring containing two to five carbon atoms, and R^c is selected from

the group consisting of C₁-C₁₀ alkyl, amino, C₁-C₁₀ haloalkyl, C₁-C₁₀ aminoalkyl, C₁-C₁₀ BOC-aminoalkyl, and C₃-C₁₀ cycloalkyl;

- X₂ is H, hydroxyl, C₁-C₁₀ alkylamino, C₁-C₁₀ alkylamido or C₁-C₁₀ hydroxyalkyl;

5 X₃ and X₄ each independently are hydrogen, hydroxyl, amino, amido, azido, halo, alkyl, alkoxy, carboxy, nitrilo, nitro, trifluoro, aryl, alkaryl, thio, thioester, thioether, -OCOPh, -OC(=S)OPh or both X₃ and X₄ are oxygen connected to >C=S to form a 5-membered ring, or X₂ and X₃ form the ring of formula (III):



10

where R' and R'' are independently C₁-C₁₀ alkyl;

15

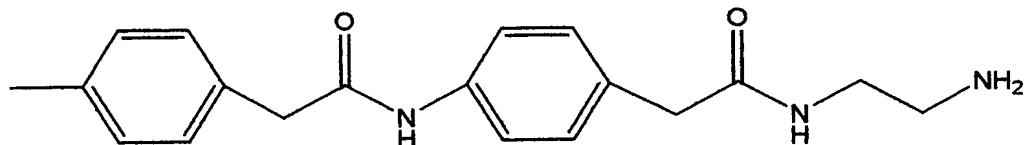
- R₂ is selected from the group consisting of hydrogen, halo, C₁-C₁₀ alkylether, amino, hydrazido, C₁-C₁₀ alkylamino, C₁-C₁₀ alkoxy, C₁-C₁₀ thioalkoxy, pyridylthio, C₂-C₁₀ alkenyl, C₂-C₁₀ alkynyl, thio, and C₁-C₁₀ alkylthio; and

20

R₃ is a -NR₄R₅ group with R₄ being hydrogen or a group selected from alkyl, substituted alkyl or aryl-NH-C(Z)-, with Z being O, S, or NR^a with R^a having the above meanings,

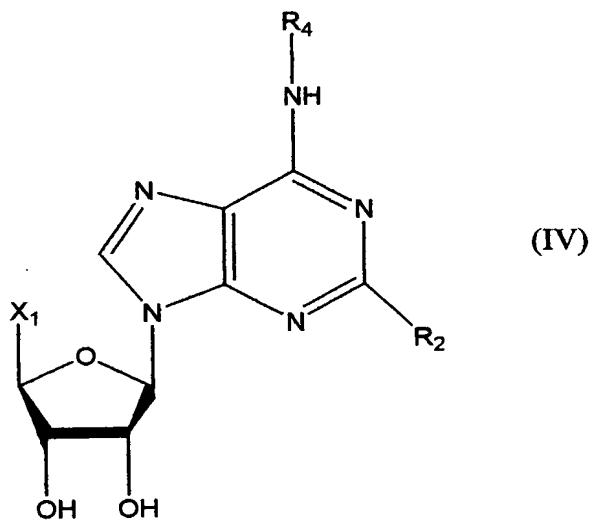
25

- And R₅, where R₄ is hydrogen, is selected from the group consisting of R- and S-1-phenylethyl, benzyl, phenylethyl or anilide groups unsubstituted or substituted in one or more positions with a substituent selected from the group consisting of C₁-C₁₀ alkyl, amino, halo, C₁-C₁₀ haloalkyl, nitro, hydroxyl, acetoamido, C₁-C₁₀ alkoxy, and sulfonic acid or a salt thereof; or R₄ is benzodioxanemethyl, fururyl, L-propylalanyl- aminobenzyl, β -alanylamino- benzyl, T-BOC- β -alanylaminobenzyl, phenylamino, carbamoyl, phenoxy or C₁-C₁₀ cycloalkyl; or R₅ is a group of the following formula:



- or a suitable salt of the compound defined above; or
when R₄ is, a group selected from alkyl, substituted alkyl, or aryl-NH-C(Z)-,
5 then, R₄ is selected from the group consisting of substituted or unsubstituted
heteroaryl-NR^a-C(Z)-, heteroaryl-C(Z)-, alkaryl-NR^a-C(Z)-, alkaryl-C(Z)-,
aryl-NR-C(Z)- and aryl-C(Z)-;
wherein Z having the above defined meanings.

23. A method according to Claim 19, wherein said active ingredient is a
10' nucleoside derivative of the general formula (IV):



in which X₁, R₁, and R₄ are as defined in Claim 19.

24. A method according to Claim 23, wherein said active ingredient is an N6-
15 benzyladenosine-5'-uronamide.

25. A method according to Claim 24, wherein said active ingredient is selected
from the group consisting of N⁶-2-(4-aminophenyl)ethyladenosine (APNEA), N⁶-(4-

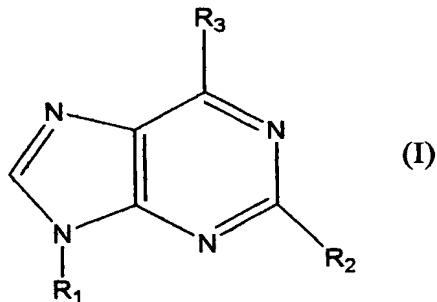
amino-3- iodobenzyl) adenosine-5'-(N-methyluronamide) (AB-MECA) and 1-deoxy-1-{6- [{(3-iodophenyl} methyl)amino]- 9H-purine-9-yl}-N-methyl- β -D-ribofuranuron-amide (IB-MECA) and 2-chloro-N⁶-(2-iodobenzyl)-adenosine- 5'-N-methly-uronamide (Cl-IB-MECA).

5 26. A method for prevention or treatment of leukopenia, comprising administering to a subject in need an effective amount of an active ingredient selected from the group consisting of an adenosine A3 receptor agonist (A3RAg), an A2RAn and a combination of an A3RAg or an A2RAn.

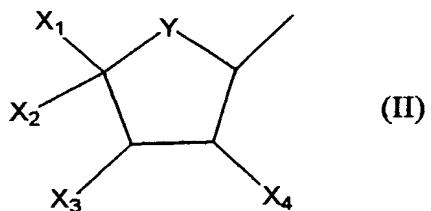
27. A method according to Claim 20, for prevention or treatment of drug- induced leukopenia.

28. A method according to Claim 26, wherein said active ingredient is an A3RAg.

29. A method according to Claim 28, wherein the active ingredient is a nucleotide derivative of the following general formula (I):



15 wherein R₁ is C₁-C₁₀ alkyl, C₁-C₁₀ hydroxyalkyl, C₁-C₁₀ carboxyalkyl or C₁-C₁₀ cyanoalkyl or a group of the following general formula (II):



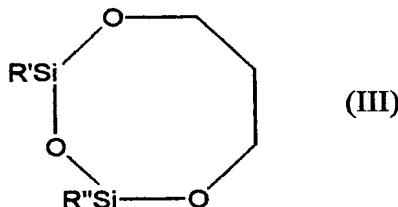
in which:

- Y is oxygen, sulfur or carbon atoms;

5 - X_1 is H, C_1 - C_{10} alkyl, $R^aR^bNC(=O)-$ or HOR^c- , wherein R^a and R^b may be the same or different and are selected from the group consisting of hydrogen, C_1 - C_{10} alkyl, amino, C_1 - C_{10} haloalkyl, C_1 - C_{10} aminoalkyl, C_1 - C_{10} BOC-aminoalkyl, and C_3 - C_{10} cycloalkyl or are joined together to form a heterocyclic ring containing two to five carbon atoms, and R^c is selected from the group consisting of C_1 - C_{10} alkyl, amino, C_1 - C_{10} haloalkyl, C_1 - C_{10} aminoalkyl, C_1 - C_{10} BOC-aminoalkyl, and C_3 - C_{10} cycloalkyl;

10 - X_2 is H, hydroxyl, C_1 - C_{10} alkylamino, C_1 - C_{10} alkylamido or C_1 - C_{10} hydroxyalkyl;

15 - X_3 and X_4 each independently are hydrogen, hydroxyl, amino, amido, azido, halo, alkyl, alkoxy, carboxy, nitrilo, nitro, trifluoro, aryl, alkaryl, thio, thioester, thioether, $-OCOPh$, $-OC(=S)OPh$ or both X_3 and X_4 are oxygen connected to $>C=S$ to form a 5-membered ring, or X_2 and X_3 form the ring of formula (III):



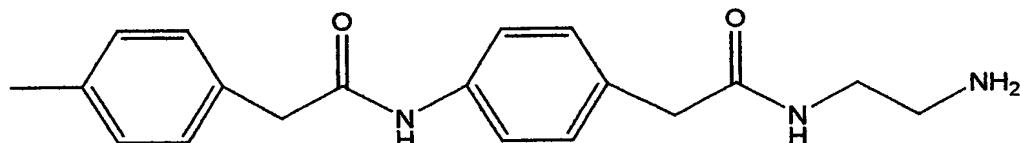
15 where R' and R'' are independently C_1 - C_{10} alkyl;

20 - R_2 is selected from the group consisting of hydrogen, halo, C_1 - C_{10} alkylether, amino, hydrazido, C_1 - C_{10} alkylamino, C_1 - C_{10} alkoxy, C_1 - C_{10} thioalkoxy, pyridylthio, C_2 - C_{10} alkenyl, C_2 - C_{10} alkynyl, thio, and C_1 - C_{10} alkylthio; and

25 R_3 is a $-NR_4R_5$ group with R_4 being hydrogen or a group selected from alkyl, substituted alkyl or aryl- $NH-C(Z)-$, with Z being O, S, or NR^a with R^a having the above meanings,

25 - And R_5 , where R_4 is hydrogen, is selected from the group consisting of R- and S-1-phenylethyl, benzyl, phenylethyl or anilide groups unsubstituted or substituted in one or more positions with a substituent selected from the

group consisting of C₁-C₁₀ alkyl, amino, halo, C₁-C₁₀ haloalkyl, nitro, hydroxyl, acetoamido, C₁-C₁₀ alkoxy, and sulfonic acid or a salt thereof; or R₄ is benzodioxanemethyl, fururyl, L-propylalanyl- aminobenzyl, β -alanylalmino- benzyl, T-BOC- β -alanylaminobenzyl, phenylamino, carbamoyl, phenoxy or C₁-C₁₀ cycloalkyl; or R₅ is a group of the following formula:

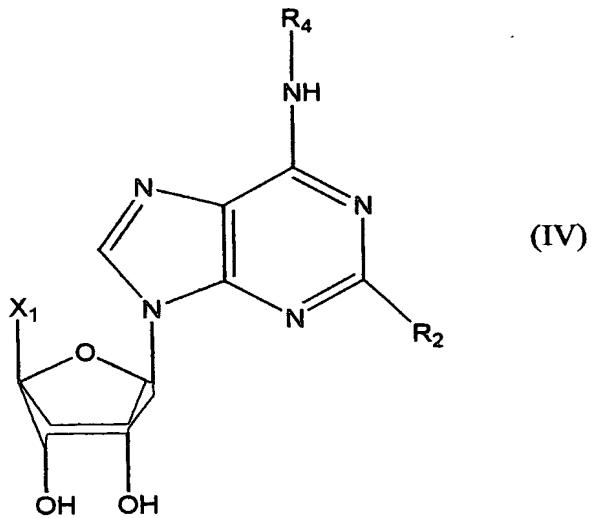


- or a suitable salt of the compound defined above, e.g. a triethylammonium salt thereof; or

when R₄ is, a group selected from alkyl, substituted alkyl, or aryl-NH-C(Z)-, then, R₄ is selected from the group consisting of substituted or unsubstituted heteroaryl-NR^a-C(Z)-, heteroaryl-C(Z)-, alkaryl-NR^a-C(Z)-, alkaryl-C(Z)-, aryl-NR-C(Z)- and aryl-C(Z)-;

wherein Z having the above defined meanings.

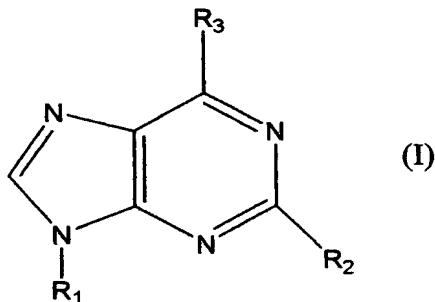
15 30. A method according to Claim 29, wherein said active ingredient is a nucleoside derivative of the general formula (IV):



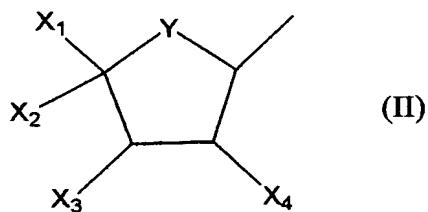
in which X_1 , R_2 and R_4 are as defined in Claim 28.

31. A method according to Claim 30, wherein said active ingredient is an N^6 -benzyladenosine-5'-uronamide.
- 5 32. A method according to Claim 31, wherein said active ingredient is selected from the group consisting of N^6 -2-(4-aminophenyl)ethyladenosine (APNEA), N^6 -(4-amino-3- iodobenzyl) adenosine-5'-(N-methyluronamide) (AB-MECA) and 1-deoxy-1-{6- [{(3-iodophenyl) methyl}amino]- 9H-purine-9-yl}-N-methyl- β -D-ribofuranuron-amide (IB-MECA) and 2-chloro- N^6 -(2-iodobenzyl)-adenosine- 5'-N-10 methy-uronamide (Cl-IB-MECA).
- 15 33. A method for prevention or treatment of toxic side effects of a drug, comprising administering to a subject in need an effective amount of an active ingredient selected from the group consisting of an adenosine A3 receptor agonist (A3RAg), an adenosine A2 receptor antagonists (A2RAn) and a combination of an A3RAg and an A2RAn.
34. A method according to Claim 33, wherein the toxic side effect is manifested by weight loss.
35. A method according to Claim 33, wherein said drug is a chemotherapeutic drug.
- 20 36. A method according to Claim 33, wherein said active ingredient is A3RAg.

37. A method according to Claim 36, wherein said active ingredient is a nucleotide derivative of the following general formula (I):



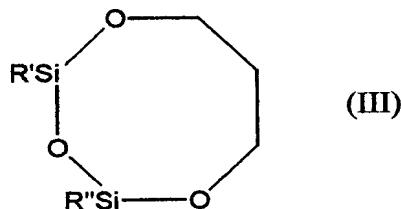
wherein R₁ is C₁-C₁₀ alkyl, C₁-C₁₀ hydroxyalkyl, C₁-C₁₀ carboxyalkyl or C₁-C₁₀ cyanoalkyl or a group of the following general formula (II):



in which:

- Y is oxygen, sulfur or carbon atoms;
- X₁ is H, C₁-C₁₀ alkyl, R^aR^bNC(=O)- or HOR^c-, wherein R^a and R^b may be the same or different and are selected from the group consisting of hydrogen, C₁-C₁₀ alkyl, amino, C₁-C₁₀ haloalkyl, C₁-C₁₀ aminoalkyl, C₁-C₁₀ BOC-aminoalkyl, and C₃-C₁₀ cycloalkyl or are joined together to form a heterocyclic ring containing two to five carbon atoms, and R^c is selected from the group consisting of C₁-C₁₀ alkyl, amino, C₁-C₁₀ haloalkyl, C₁-C₁₀ aminoalkyl, C₁-C₁₀ BOC-aminoalkyl, and C₃-C₁₀ cycloalkyl;
- X₂ is H, hydroxyl, C₁-C₁₀ alkylamino, C₁-C₁₀ alkylamido or C₁-C₁₀ hydroxyalkyl;
- X₃ and X₄ each independently are hydrogen, hydroxyl, amino, amido, azido, halo, alkyl, alkoxy, carboxy, nitrilo, nitro, trifluoro, aryl, alkaryl, thio,

thioester, thioether, -OCOPh, -OC(=S)OPh or both X₃ and X₄ are oxygen connected to >C=S to form a 5-membered ring, or X₂ and X₃ form the ring of formula (III):



5

where R' and R'' are independently C₁-C₁₀ alkyl;

- R₂ is selected from the group consisting of hydrogen, halo, C₁-C₁₀ alkylether, amino, hydrazido, C₁-C₁₀ alkylamino, C₁-C₁₀ alkoxy, C₁-C₁₀ thioalkoxy, pyridylthio, C₂-C₁₀ alkenyl, C₂-C₁₀ alkynyl, thio, and C₁-C₁₀ alkylthio; and

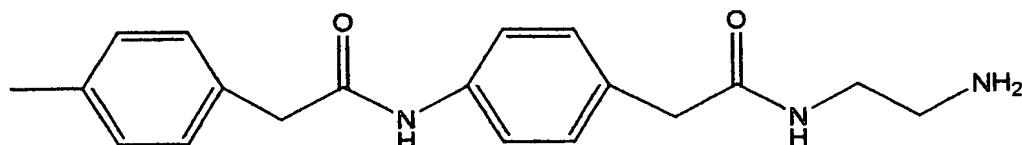
10

R₃ is a -NR₄R₅ group with R₄ being hydrogen or a group selected from alkyl, substituted alkyl or aryl-NH-C(Z)-, with Z being O, S, or NR^a with R^a having the above meanings,

- And R₅, where R₄ is hydrogen, is selected from the group consisting of R- and S-1-phenylethyl, benzyl, phenylethyl or anilide groups unsubstituted or substituted in one or more positions with a substituent selected from the group consisting of C₁-C₁₀ alkyl, amino, halo, C₁-C₁₀ haloalkyl, nitro, hydroxyl, acetoamido, C₁-C₁₀ alkoxy, and sulfonic acid or a salt thereof; or R₄ is benzodioxanemethyl, fururyl, L-propylalanyl- aminobenzyl, β -alanylamino- benzyl, T-BOC- β -alanylaminobenzyl, phenylamino, carbamoyl, phenoxy or C₁-C₁₀ cycloalkyl; or R₅ is a group of the following formula:

15

20

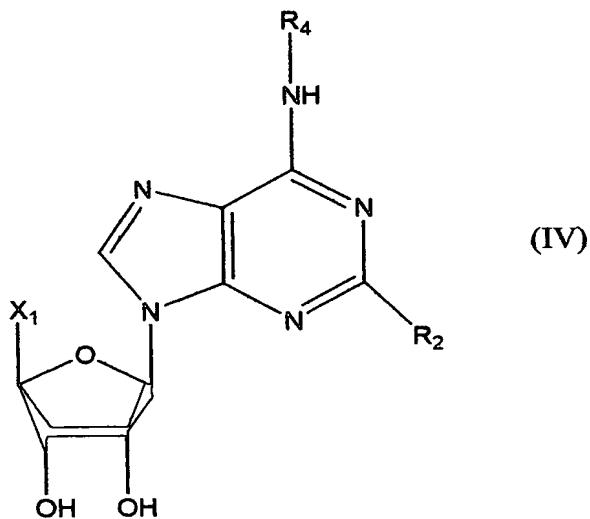


- or a suitable salt of the compound defined above, e.g. a triethylammonium salt thereof; or

when R₄ is, a group selected from alkyl, substituted alkyl, or aryl-NH-C(Z)-, then, R₄ is selected from the group consisting of substituted or unsubstituted heteroaryl-NR^a-C(Z)-, heteroaryl-C(Z)-, alkaryl-NR^a-C(Z)-, alkaryl-C(Z)-, aryl-NR-C(Z)- and aryl-C(Z)-;

5 wherein Z having the above defined meanings.

38. A method according to Claim 37, wherein said active ingredient is a nucleoside derivative of the general formula (IV):



10

in which X₁, R₂ and R₄ are as defined in Claim 37.

39. A method according to Claim 38, wherein said active ingredient is an N⁶-benzyladenosine-5'-uronamide.

15 40. A method according to Claim 39, wherein said active ingredient is selected from the group consisting of N⁶-2-(4-aminophenyl)ethyladenosine (APNEA), N⁶-(4-amino-3- iodobenzyl) adenosine-5'-(N-methyluronamide) (AB-MECA) and 1-deoxy-1-{6- [{(3-iodophenyl} methyl]amino]- 9H-purine-9-yl}-N-methyl- β -D-ribofuranuron-amide (IB-MECA) and 2-chloro-N⁶-(2-iodobenzyl)-adenosine- 5'-N-
20 methly-uronamide (Cl-IB-MECA).

41. A method for inhibiting abnormal cell growth in a subject, comprising administering to the subject a therapeutically effective amount of an active ingredient selected from the group consisting of an adenosine A3 receptor agonist (A3RAg), an adenosine A2 receptor agonist (A2RAg) and a combination of A3RAg and A2RAg.

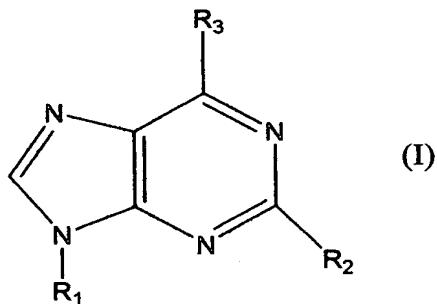
5 42. A method according to Claim 41, for inhibiting growth or proliferation of tumor cells.

43. A method according to Claim 41, wherein the active ingredient is an A3RAg.

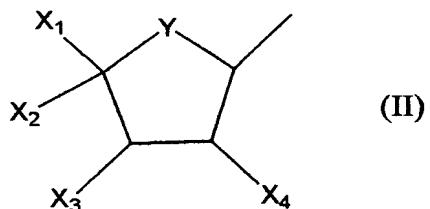
44. A method according to Claim 43, wherein the drug is administered orally.

45. A method according to Claim 41, wherein the drug is administered in 10 combination with a chemotherapeutic drug.

10 46. A method according to Claim 41, wherein the active ingredient is a nucleotide derivative of the following general formula (I):



wherein R₁ is C₁-C₁₀ alkyl, C₁-C₁₀ hydroxyalkyl, C₁-C₁₀ carboxyalkyl or C₁-C₁₀ 15 cyanoalkyl or a group of the following general formula (II):



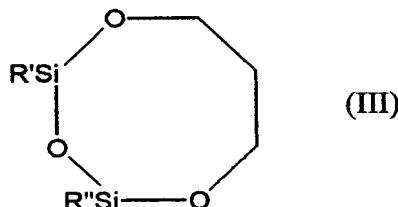
in which:

- Y is oxygen, sulfur or carbon atoms;

5 - X_1 is H, C_1-C_{10} alkyl, $R^aR^bNC(=O)-$ or HOR^c- , wherein R^a and R^b may be the same or different and are selected from the group consisting of hydrogen, C_1-C_{10} alkyl, amino, C_1-C_{10} haloalkyl, C_1-C_{10} aminoalkyl, C_1-C_{10} BOC-aminoalkyl, and C_3-C_{10} cycloalkyl or are joined together to form a heterocyclic ring containing two to five carbon atoms, and R^c is selected from the group consisting of C_1-C_{10} alkyl, amino, C_1-C_{10} haloalkyl, C_1-C_{10} aminoalkyl, C_1-C_{10} BOC-aminoalkyl, and C_3-C_{10} cycloalkyl;

10 - X_2 is H, hydroxyl, C_1-C_{10} alkylamino, C_1-C_{10} alkylamido or C_1-C_{10} hydroxyalkyl;

15 - X_3 and X_4 each independently are hydrogen, hydroxyl, amino, amido, azido, halo, alkyl, alkoxy, carboxy, nitrilo, nitro, trifluoro, aryl, alkaryl, thio, thioester, thioether, $-OCOPh$, $-OC(=S)OPh$ or both X_3 and X_4 are oxygen connected to $>C=S$ to form a 5-membered ring, or X_2 and X_3 form the ring of formula (III):



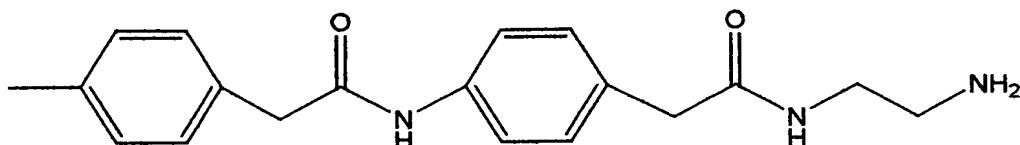
15 where R' and R'' are independently C_1-C_{10} alkyl;

20 - R_2 is selected from the group consisting of hydrogen, halo, C_1-C_{10} alkylether, amino, hydrazido, C_1-C_{10} alkylamino, C_1-C_{10} alkoxy, C_1-C_{10} thioalkoxy, pyridylthio, C_2-C_{10} alkenyl, C_2-C_{10} alkynyl, thio, and C_1-C_{10} alkylthio; and

25 R_3 is a $-NR_4R_5$ group with R_4 being hydrogen or a group selected from alkyl, substituted alkyl or aryl-NH-C(Z)-, with Z being O, S, or NR^a with R^a having the above meanings,

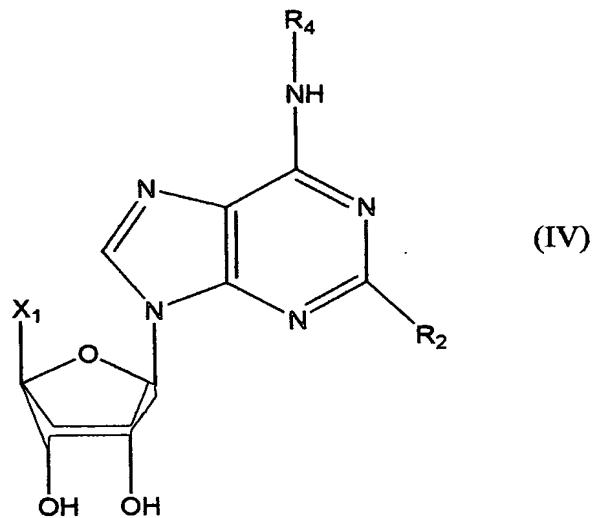
25 - And R_5 , where R_4 is hydrogen, is selected from the group consisting of R- and S-1-phenylethyl, benzyl, phenylethyl or anilide groups unsubstituted or substituted in one or more positions with a substituent selected from the

group consisting of C₁-C₁₀ alkyl, amino, halo, C₁-C₁₀ haloalkyl, nitro, hydroxyl, acetoamido, C₁-C₁₀ alkoxy, and sulfonic acid or a salt thereof; or R₄ is benzodioxanemethyl, fururyl, L-propylalanyl- aminobenzyl, β -alanylalmino- benzyl, T-BOC- β -alanylaminobenzyl, phenylamino, carbamoyl, phenoxy or C₁-C₁₀ cycloalkyl; or R₅ is a group of the following formula:



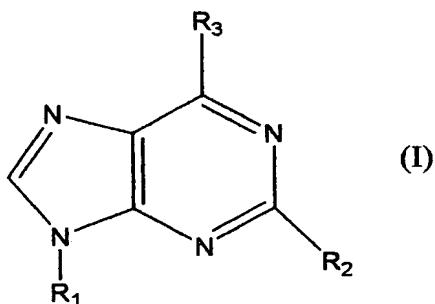
- or a suitable salt of the compound defined above, e.g. a triethylammonium salt thereof; or
10 when R₄ is, a group selected from alkyl, substituted alkyl, or aryl-NH-C(Z)-, then, R₄ is selected from the group consisting of substituted or unsubstituted heteroaryl-NR^a-C(Z)-, heteroaryl-C(Z)-, alkaryl-NR^a-C(Z)-, alkaryl-C(Z)-, aryl-NR-C(Z)- and aryl-C(Z)-;
15 wherein Z having the above defined meanings.

47. A method according to Claim 46, wherein said active ingredient is a nucleoside derivative of the general formula (IV):

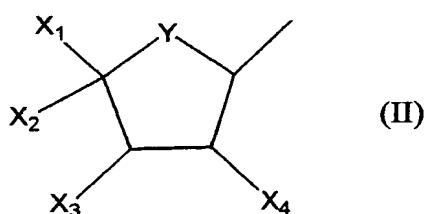


in which X₁, R₂ and R₄ are as defined in Claim 15.

48. A method according to Claim 47, wherein said active ingredient is an N⁶-benzyladenosine-5'-uronamide.
- 5 49. A method according to Claim 48, wherein said active ingredient is selected from the group consisting of N⁶-2-(4-aminophenyl)ethyladenosine (APNEA), N⁶-(4-amino-3- iodobenzyl) adenosine-5'-(N-methyluronamide) (AB-MECA) and 1-deoxy-1-{6- [{(3-iodophenyl) methyl}amino]- 9H-purine-9-yl}-N-methyl- β -D-ribofuranuron-amide (IB-MECA) and 2-chloro-N⁶-(2-iodobenzyl)-adenosine- 5'-N-methyl-uronamide (Cl-IB-MECA).
- 10 50. A method for treating cancer in a subject, comprising administering to the subject an effective amount of an adenosine A₃ receptor agonist (A₃Rag), the administration of the A₃RAg yielding a dual effect in both inhibiting proliferation of cancer cells and countering toxic side effects of chemotherapeutic drug treatment of the same subject.
- 15 51. A method according to Claim 50, wherein the A₃Rag synergizes with said drug to yield a stronger anti-tumor effect.
52. A method according to Claim 50, wherein the drug is administered orally.
53. A method according to Claim 50, wherein the active ingredient is a nucleotide derivative of the following general formula (I):



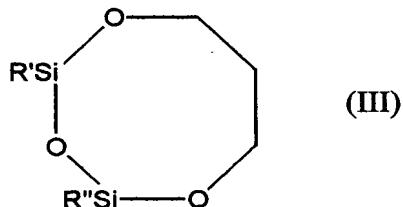
wherein R₁ is C₁-C₁₀ alkyl, C₁-C₁₀ hydroxyalkyl, C₁-C₁₀ carboxyalkyl or C₁-C₁₀ cyanoalkyl or a group of the following general formula (II):



5 in which:

- Y is oxygen, sulfur or carbon atoms;
- X₁ is H, C₁-C₁₀ alkyl, R^aR^bNC(=O)- or HOR^c-, wherein R^a and R^b may be the same or different and are selected from the group consisting of hydrogen, C₁-C₁₀ alkyl, amino, C₁-C₁₀ haloalkyl, C₁-C₁₀ aminoalkyl, C₁-C₁₀ BOC-aminoalkyl, and C₃-C₁₀ cycloalkyl or are joined together to form a heterocyclic ring containing two to five carbon atoms, and R^c is selected from the group consisting of C₁-C₁₀ alkyl, amino, C₁-C₁₀ haloalkyl, C₁-C₁₀ aminoalkyl, C₁-C₁₀ BOC-aminoalkyl, and C₃-C₁₀ cycloalkyl;
- X₂ is H, hydroxyl, C₁-C₁₀ alkylamino, C₁-C₁₀ alkylamido or C₁-C₁₀ hydroxyalkyl;
- X₃ and X₄ each independently are hydrogen, hydroxyl, amino, amido, azido, halo, alkyl, alkoxy, carboxy, nitrilo, nitro, trifluoro, aryl, alkaryl, thio, thioester, thioether, -OCOPh, -OC(=S)OPh or both X₃ and X₄ are oxygen connected to >C=S

to form a 5-membered ring, or X_2 and X_3 form the ring of formula (III):



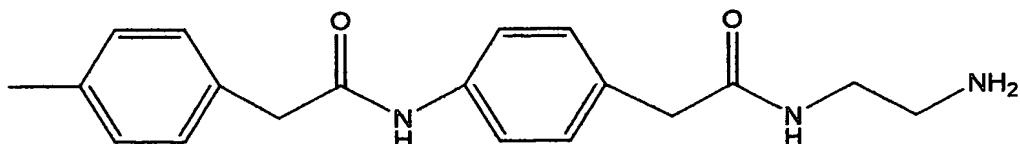
where R' and R'' are independently C_1-C_{10} alkyl;

5 - R_2 is selected from the group consisting of hydrogen, halo, C_1-C_{10} alkylether, amino, hydrazido, C_1-C_{10} alkylamino, C_1-C_{10} alkoxy, C_1-C_{10} thioalkoxy, pyridylthio, C_2-C_{10} alkenyl; C_2-C_{10} alkynyl, thio, and C_1-C_{10} alkylthio; and

10 R_3 is a $-NR_4R_5$ group with R_4 being hydrogen or a group selected from alkyl, substituted alkyl or aryl-NH-C(Z)-, with Z being O, S, or NR^a with R^a having the above meanings,

15 - And R_5 , where R_4 is hydrogen, is selected from the group consisting of R - and S-1-phenylethyl, benzyl, phenylethyl or anilide groups unsubstituted or substituted in one or more positions with a substituent selected from the group consisting of C_1-C_{10} alkyl, amino, halo, C_1-C_{10} haloalkyl, nitro, hydroxyl, acetoamido, C_1-C_{10} alkoxy, and sulfonic acid or a salt thereof; or R_4 is benzodioxanemethyl, fururyl, L-propylalanyl- aminobenzyl, β -alanylamino- benzyl, T-BOC- β -alanylaminobenzyl, phenylamino, carbamoyl, phenoxy or C_1-C_{10} cycloalkyl; or R_5 is a group of the following formula:

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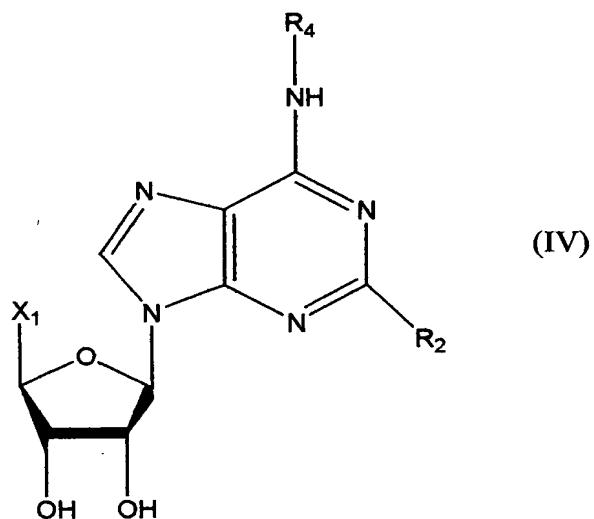


- or a suitable salt of the compound defined above, e.g. a triethylammonium salt thereof; or

when R₄ is, a group selected from alkyl, substituted alkyl, or aryl-NH-C(Z)-, then, R₄ is selected from the group consisting of substituted or unsubstituted heteroaryl-NR^a-C(Z)-, heteroaryl-C(Z)-, alkaryl-NR^a-C(Z)-, alkaryl-C(Z)-, aryl-NR-C(Z)- and aryl-C(Z)-;

5 wherein Z having the above defined meanings.

54. A method according to Claim 53, wherein said active ingredient is a
10 nucleoside derivative of the general formula (IV):



in which X₁, R₂ and R₄ are as defined in Claim 53.

15 55. A method according to Claim 54, wherein said active ingredient is an N6-benzyladenosine-5'-uronamide.

56. A method according to Claim 55, wherein said active ingredient is selected
from the group consisting of N⁶-2-(4-aminophenyl)ethyladenosine (APNEA), N⁶-(4-
amino-3- iodobenzyl) adenosine-5'-(N-methyluronamide) (AB-MECA) and 1-deoxy-
20 1-{6- [{(3-iodophenyl} methyl]amino]- 9H-purine-9-yl}-N-methyl- β-D-

ribofuranuron-amide (IB-MECA) and 2-chloro-N⁶-(2-iodobenzyl)-adenosine- 5'-N-methyl-uronamide (Cl-IB-MECA).